

3.0 AFFECTED ENVIRONMENT

Section 3.0 describes the natural and human environment that could be affected by the Proposed Action and the No Action Alternative. Based on the Proposed Action description, environmental resources that may potentially be affected as a result of implementing the Proposed Action have been considered. Environmental issues were identified and either addressed in this section or not, based on the “Sliding Scale Approach” discussed earlier in this EA (Section 1.4). Table 1 identifies the subsection where potential environmental issues are discussed or notes why they are not addressed in this document.

Table 1. Potential Environmental Issues Applicable to this EA

Environmental Category	Applicability	Subsection
Air Quality	Yes	3.2
Waste Management	Yes	3.3
Environmental Restoration	Yes	3.4
Utilities and Infrastructure	Yes	3.5
Noise	Yes	3.6
Geology	Yes	3.7
Human Health	Yes	3.8
Land Use	No. Land uses and land use designations would not be affected as a result of the Proposed Action or alternatives.	N/A
Floodplains and wetlands	No. The Proposed Action would not be located in a floodplain and wetland. The Co-generation Complex outfall and Sandia Canyon wetland would not be affected as a result of this action.	N/A
Cultural Resources	No. There are no known archaeological or historic resources within the area of the Proposed Action.	N/A
Socioeconomic	No. Demolition and construction activities would employ only 20 new workers at the peak activity and would have little noticeable effect on local economy.	N/A
Environmental Justice	No. Populations that are subject to environmental justice considerations are not located within the area of influence of the Proposed Actions or alternatives. Populations nearest to the Proposed Action site are not predominantly minority and low-income populations.	N/A
Water Resources (Ground and Surface)	No. There would be no effect on water quality. There would be a decrease in water use. There would be no discharge to the Co-generation Complex outfall as a result of the Proposed Action. Cooling requirements for the CTGs are accomplished by a closed (dry) cooling system.	N/A
Visual Resources	No. All alternatives involve only local construction in an existing industrial area. No construction would result in buildings higher or more visible than the existing buildings.	N/A
Biological Resources	No. The Proposed Action would be located within previously disturbed and developed land or adjacent to disturbed areas within an industrialized area of LANL. The Proposed Action site is adequately distant from potential core habitat for areas designated as sensitive habitat for Federally listed threatened and endangered species.	N/A
Traffic and Transportation	No. The Proposed Action would not affect traffic rates or patterns on LANL or Los Alamos County roads.	N/A

3.1 Regional Setting

The Proposed Action would be located within the area of Los Alamos County that includes LANL. LANL comprises a large portion of Los Alamos County and extends into Santa Fe County. LANL is situated on the Pajarito Plateau along the eastern flank of the Jemez Mountains and consists of 49 technical areas. The Pajarito Plateau slopes downward towards the Rio Grande along the eastern edge of LANL and contains several fingerlike mesa tops separated by relatively narrow and deep canyons.

Commercial and residential development in Los Alamos County is confined primarily to several mesa tops lying north of the core LANL development, in the case of the Los Alamos town site, or southeast, in the case of the communities of White Rock and Pajarito Acres. The lands surrounding Los Alamos County are largely undeveloped wooded areas with large tracts located to the north, west, and south of LANL that are administered by the Department of Agriculture, Santa Fe National Forest and the Department of the Interior, National Park Service, Bandelier National Monument; and to the east by the Department of the Interior, BLM.

3.2 Air Quality

The Clean Air Act (CAA) (40 CFR 50) establishes air quality standards to protect public health and the environment from the harmful effects of air pollution. The act requires establishment of national standards of performance for new stationary sources of emissions, limitations for any new or modified structure that emits or may emit an air pollutant, and standards for emission of hazardous air pollutants (HAPs). In addition, the CAA requires that specific emission increases be evaluated to prevent a significant deterioration in air quality.

The Environmental Protection Agency (EPA) is the regulating authority for the CAA. However, EPA has granted the State of New Mexico primacy for regulating air quality under an approved State Implementation Plan⁹ (SIP). In New Mexico, all of the CAA regulations, with the exception of the National Emission Standards for Hazardous Air Pollutants (NESHAP) for radionuclides (40 CFR 61), certain provisions relating to Stratospheric Ozone Protection (40 CFR 82), and the Risk Management Program (40 CFR 68) have been adopted by the state as part of the SIP, and are regulated under the New Mexico Quality Control Act.

The New Mexico Environmental Improvement Board, as provided by the New Mexico Air Quality Control Act, regulates air quality through a series of air quality control regulations in the New Mexico Administrative Code (NMAC). These regulations are administered by the New Mexico Environment Department (NMED). Under the federal CAA and the SIP, LANL is subject to federal air quality regulations, including those that are not part of the SIP, and performs all work in accordance with EPA requirements and LANL standards. In addition to the existing federal programs, the 1990 amendments to the CAA mandate new program requirements that include control technology for hazardous air pollutants, enhanced monitoring, prevention of accidental releases, and chlorofluorocarbon replacement.

⁹ The purpose of the SIP is to ensure that federal emission standards are being implemented and NAAQs are being achieved.

The Proposed Action would be located in Los Alamos County. This area is in attainment with all state and national ambient air quality standards¹⁰. Air quality is a measure of the amount and distribution of potentially harmful pollutants in ambient air. Air surveillance at Los Alamos includes monitoring emissions to determine the air quality effects of LANL operations. UC staff at LANL calculates annual actual LANL emissions of regulated air pollutants and reports the results annually to the NMED. The ambient air quality in and around LANL meets all EPA and DOE standards for protecting the public and workers (LANL 2001b).

Mobile sources, such as automobiles and construction vehicles, are additional sources of air emissions; however, mobile sources are not regulated by NMED. Diesel emissions from conveyance vehicles are not regulated as stationary sources of emissions. Mechanical equipment including bulldozers, excavators, backhoes, cranes, tamper compactors, trenchers, and drill rigs are exempt from permitting under Title 20 of the NMAC Part 2.72, *Construction Permits*. This type of exemption does not require notification to NMED.

Both EPA and NMED regulate nonradioactive air emissions. NMED does not regulate dust from excavation or construction, but UC or their subcontractors take appropriate steps during construction activities to control fugitive dust and particulate emissions using, for example, best achievable control measures of water sprays or soil tackifiers¹¹. Excavation and construction activities are not considered stationary sources of regulated air pollutants under the New Mexico air quality requirements; these activities are not subject to permitting under 20 NMAC, Parts 2.70 and 2.72. Annual dust emissions from daily windblown dust are generally higher than short-term construction-related dust emissions. LANL would ensure that the New Mexico Ambient Air Quality Standards (NMAAQs) and the National Ambient Air Quality Standards (NAAQS) for particulate emissions are met throughout any construction activities.

Provisions of 20 NMAC 2.72 require construction permits for new or modified sources of regulated air pollutants. Currently, air quality permit No. 2195B limits NO_x from the three existing Co-generation Complex boilers to 99.6 tpy. All new sources would be limited to 40 tpy NO_x emissions per unit. The proposed simple-cycle CTGs and the combined-cycle co-generation CTGs would be subject to the Subpart GG of the NSPS for gas turbines which specifies emission standards for NO_x and SO₂ and fuel monitoring for nitrogen and sulfur content. Although NO_x is the primary concern and focus for CTGs, the next pollutant of concern for gas-fired CTGs is CO because of potential permit issues, such as PSD permitting. CO, itself, is not harmful until it reaches higher concentrations than other pollutants. For this reason, PSD review for a modification is triggered at 100 tpy for CO emissions, as opposed to 40 tpy for NO_x emissions. Stack testing would be conducted on the proposed CTGs prior to submitting an air quality permit modification to NMED. Permitting would take approximately six months.

¹⁰ Ambient air is defined in 40 CFR 50.1 as “that portion of the atmosphere external to buildings, to which the public has access.” It is defined in the NMAC Title 20, chapter 2, part 72, as “the outdoor atmosphere, but does not include the area entirely within the boundaries of the industrial or manufacturing property within which the air contaminants are or may be emitted and public access is restricted within such boundaries.”

¹¹ Tackifiers are chemical dust suppressants often added to water that act to disperse the chemicals, then evaporate after application. The chemicals that are left behind bind the soil particles together into larger particles that are less easily blown in the air.

3.3 Waste Management

LANL generates solid waste¹² from construction, demolition, and facility operations. These wastes are managed and disposed of at appropriate solid waste facilities. Both LANL and Los Alamos County use the same solid waste landfill located within LANL boundaries on DOE-administered land. The Los Alamos County Landfill also accepts solid waste from other neighboring communities. The Los Alamos County Landfill receives about 52 tons per day (47 metric tons per day), with LANL contributing about eight tons per day (seven metric tons per day), or about 15 percent of the total. When the current Los Alamos County Landfill closes, it would be capped and monitored and a portion of the site could be used as a transfer station and recycling center. NNSA and UC are currently investigating future waste management options for LANL solid waste.

Building-debris storage yards on Sigma Mesa, the Los Alamos County Landfill or other approved material management areas at LANL are currently used to store concrete rubble, asphalt, and clean soil for future re-use at LANL or for recycling offsite. Hazardous waste¹³ regulated under RCRA is transported to TA-54 at LANL for proper management, which is carried out in accordance with applicable laws, regulations, and DOE Orders. Hazardous wastes and mixed wastes are both treated and disposed of offsite since LANL has no onsite disposal capability for these waste types. The offsite disposal locations are located across the US and are audited for regulatory compliance before being used by UC.

There is one consolidated PRS that is of potential concern to the Proposed Action. Depending on the selected orientation of the CTG and confirmatory sampling, remediation of this PRS may be required before installation activities could proceed.

3.4 Environmental Restoration

NNSA and UC staff at LANL are jointly responsible for implementing the DOE ER Program at LANL, which is a designated RCRA hazardous waste facility. The ER Project is governed primarily by the corrective action process prescribed in the RCRA, but it is also subject to other applicable laws and regulations and to LANL policies. The NMED administers RCRA in New Mexico. NNSA, through the Los Alamos Site Office, conducts site characterization and waste cleanup (corrective action) activities at PRSs at LANL. Site characterization and cleanup is needed to reduce risk to human health and the environment posed by potential releases of contaminants at ER project sites.

¹² Solid waste, as defined in 40 CFR 261.2 and in 20 NMAC 9.1, is any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility, and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities.

¹³ Hazardous waste, as defined in 40 CFR 261.3, which addresses RCRA regulations, and by reference in 20 NMAC 4.1, is waste that meets any of the following criteria: a) waste exhibits *any* of the four characteristics of a hazardous waste: ignitability, corrosivity, reactivity, or toxicity; b) waste is specifically *listed* as being hazardous in one of the four tables in Subpart D of the CFR; c) waste is a mixture of a *listed* hazardous waste item and a nonhazardous waste; d) waste has been *declared* to be hazardous by the generator.

PRs include SWMUs¹⁴ and AOCs¹⁵, collectively. PRs at LANL include septic tanks and lines, chemical storage areas, wastewater outfalls (the area below a pipe that drains wastewater), material disposal areas (landfills), incinerators, firing ranges and their impact areas, surface spills, and electric transformers. PRs are found on mesa tops, in material disposal areas, in canyons, and in a few areas in the Los Alamos town site.

The primary means of contaminant release from these sites are surface water runoff carrying potentially contaminated sediments and soil erosion exposing buried contaminants. The main pathways by which released contaminants can migrate are infiltration into alluvial aquifers, airborne dispersion of particulate matter, and sediment migration from surface runoff. The contaminants involved include volatile organic compounds, semivolatile organic compounds, polychlorinated biphenyls (PCBs), asbestos, pesticides, heavy metals, beryllium, radionuclides, petroleum products, and high explosives (HE). The 1999 LANL SWEIS (DOE 1999a) contains additional information on contaminants. There is one consolidated PR that is of potential concern to the Proposed Action.

3.5 Utilities and Infrastructure

Section 4.9.2 of the 1999 LANL SWEIS (DOE 1999a) describes utility and infrastructure services at LANL. The utilities and infrastructure in and around LANL under the Preferred Alternative selected in the SWEIS ROD are described in detail in Section 5.5.9.2 of the SWEIS. Utility systems at LANL include electrical service, natural gas, communications lines, steam, water, sanitary wastewater, and refuse. The LANL Comprehensive Site Plan 2000 (LANL 2001c) documents that design redundancy into the power system is necessary to avoid potential curtailment of a large percentage of LANL operations in the event of a power line disruption.

The SWEIS Yearbook–2000 (LANL 2001a) notes that total gas consumption in FY2000 was less than projected by the SWEIS ROD (1.84 million decatherms) because of warmer than normal weather, however, more gas than anticipated was used for electric generation at the TA-3 Co-generation Complex. According to the Yearbook, LANL used about 1.43 million decatherms of natural gas in FY2000 and approximately 90 percent of this was used for heating (both steam and hot air). The remainder was used for electrical production to fill the difference between peak loads and electric contractual import rights.

3.6 Noise

Noise is defined as unwanted sound. Noise is categorized into two types: *continuous noise*, which is characterized as longer duration and lower intensity, such as a running motor, and *impulsive or impact noise*, which is characterized by short duration and high intensity, such as

¹⁴ A SWMU is defined in the Hazardous and Solid Waste Amendments Module VIII of LANL's Hazardous Waste Facility Permit as "any discernible unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at or around a facility at which solid wastes have been routinely and systematically released."

¹⁵ Sites that potentially contain hazardous substances but not hazardous wastes or hazardous constituents as defined by RCRA are called AOCs. The different geologic media of the canyons system – sediments, aquifers, and parent material are categorized as AOCs.

the detonation of HE. The intensity of sound is measured in decibel units and has been modified into an A-weighted frequency scale (dBA) for setting human auditory limits.

Noise measured at LANL is primarily from occupational exposures that generally take place inside buildings. Occupational exposures are compared against an established Threshold Limit Value (TLV). The TLV is administratively defined as the sound level to which a worker may be exposed for a specific work period without probable adverse effects on hearing acuity. The TLV for continuous noise is 85 dBA for an 8-hour workday. The TLV for impulsive noise during an 8-hour workday is not fixed because the number of impulses allowed per day varies depending on the dBA of each impulse, however, no individual impulse should exceed 140 dBA. An action level (level of exposure to workplace noise that is below the TLV, but the use of PPE is recommended) has been established for noise in the workplace at LANL. The action level for continuous noise is 82 dBA for an 8-hour workday. Because of the nature of the operations and staffing requirements at the existing steam plant, a hearing protection program is in effect.

Environmental noise levels at LANL are measured outside of buildings and away from routine operations. These sound levels are highly variable and are dependent on the generator. The following are typical examples of sound levels (dBA) generated: barking dogs (58), sport events (74), nearby vehicle traffic (63), aircraft overhead (66), children playing (65), and birds chirping (54). Sources of environmental noise at LANL consist of background sound, vehicular traffic, routine operations, and periodic HE testing. Measurements of environmental noise in and around LANL facilities and operations average below 80 dBA.

The averages of measured values from limited ambient environmental sampling in Los Alamos County were found to be consistent with expected sound levels (55 dBA) for outdoors in residential areas. Background sound levels at the White Rock community ranged from 38 to 51 dBA (Burns 1995) and from 31 to 35 dBA at the entrance of Bandelier National Monument (Vigil 1995). The minimum and maximum values for LANL and the County ranged between 38 dBA and 96 dBA, respectively.

3.7 Geologic Setting

The Jemez Mountains volcanic field (JMVf) is located in northern New Mexico at the intersection of the western margin of the Rio Grande rift and the Jemez Lineament (Figure 6) (Smith et al., 1970; Gardner et al., 1986; Heiken et al., 1996). The Jemez Lineament is a northeast-southwest trending alignment of young volcanic fields ranging from the Springerville volcanic field in east-central Arizona to the Raton volcanic field of northeastern New Mexico (Heiken et al., 1996). The JMVf is the largest volcanic center along this lineament (ERP 1992). Volcanism in the JMVf spans a roughly 16-million-year period beginning with the eruptions of numerous basaltic lava flows. Various other eruptions of basaltic, rhyolitic, and intermediate composition lavas and ash flows occurred sporadically during the next 15 million years with volcanic activity culminating in the eruption of the rhyolitic Bandelier Tuff at 1.68 and 1.23 million years ago (Self and Sykes 1996). All of LANL property is within the JMVf and is sited along the western edge of the Rio Grande Rift. Most of the bedrock on LANL property is composed of Bandelier Tuff.

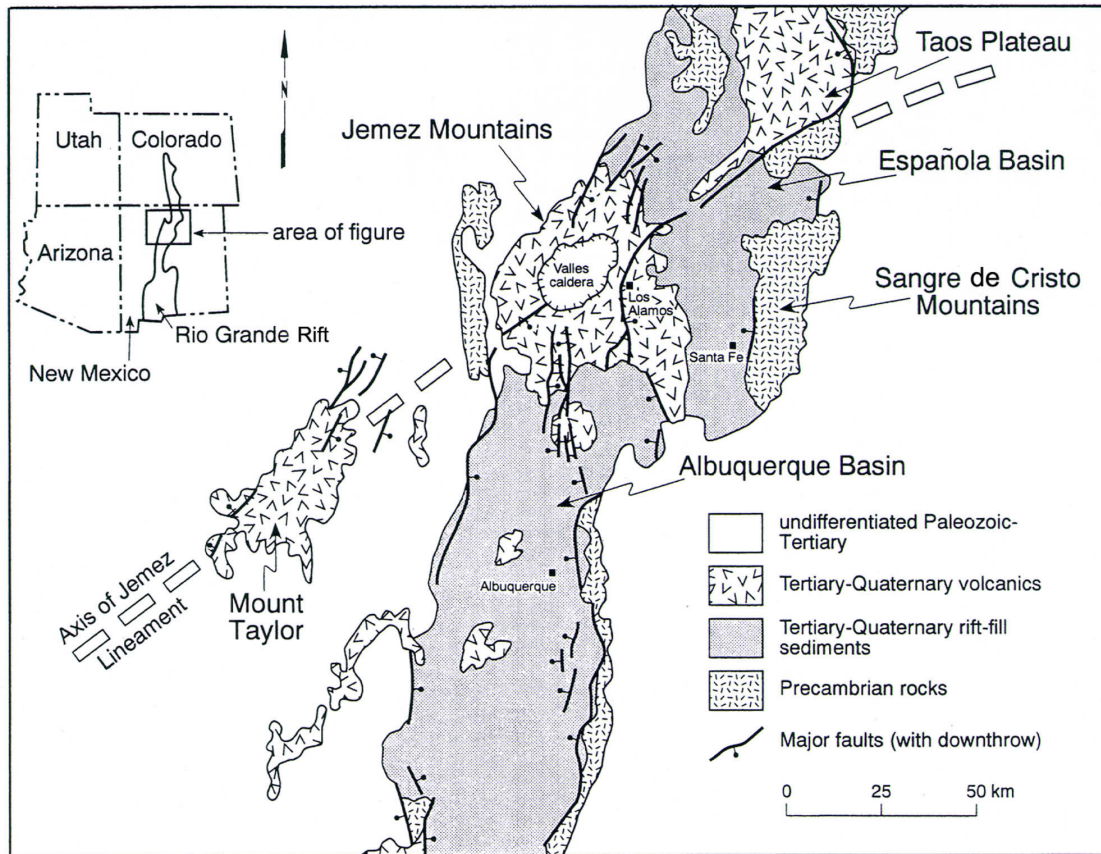


Figure 6. Generalized geologic map of the Rio Grande rift in the vicinity of the JMVF (Self and Sykes 1996).

The geologic structure of the LANL area is dominated by the north-trending Pajarito Fault Zone. The Pajarito Fault system forms the western structural boundary of the Rio Grande rift, along the western edge of the Española Basin (Figure 6), and the eastern edge of the JMVF. The Pajarito Fault zone consists of three major faults (Pajarito Fault, Rendija Canyon Fault, and the Guaje Mountain Fault) and numerous secondary faults with vertical displacements ranging from 80 to 400 ft (24 to 120 m). Estimates of the timing of the most recent surface rupturing paleoearthquakes along this fault range from 3,000 to 24,000 years ago (Reneau and Gardner 1999; Calpin 2000; Gardner et al., 1999, 2001).

3.8 Human Health

The health of LANL workers is routinely monitored depending upon the type of work they perform. Health monitoring programs for LANL workers consider a wide range of potential concerns including exposures to radioactive materials, hazardous chemicals, physical or environmental hazards, and routine workplace hazards. In addition, LANL workers involved in hazardous operations are protected by various engineering or process controls and required to wear appropriate PPE. Training is also required to identify and avoid or correct potential hazards typically found in the work environment and to respond to emergency situations. Because of the various health monitoring programs and the requirements for PPE and routine health and safety

training, LANL workers are generally considered to be a healthy workforce with a below average incidence of work-related injuries and illnesses.

LANL staff monitors environmental media for contaminants that could affect non-LANL workers or members of the public. This information is reported to regulatory agencies, such as the NMED and to the public through various permits and reporting mechanisms and is used to assess the effects of routine operations at LANL on the general public. For detailed information about environmental media monitoring and doses to the public, see LANL's Environmental Surveillance Report for 2000 (LANL 2001a). For those persons that work within the boundaries of LANL as subcontractors or demolition workers and could be exposed to radioactive or other hazardous materials, their exposures are monitored in the same manner as UC workers. Site-specific training and PPE requirements also apply to these workers.